AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A method for transmitting packets to mobile stations in a forward link of a multibeam satellite communication system, comprising the steps of:

a multicarrier satellite system using a packet-switching method, wherein downlink beams of a satellite share a same orthogonal spreading code for transmitting packets to the mobile stations among beams by synchronizing and transmitting signals of all beams, and wherein downlink beams of the satellite have a frame structure that shares the orthogonal spreading codes among users,

a) generating downlink beam signals by using an identical structure for frames transmitted through the downlink beams and an identical pseudo-noise (PN) scrambling code for generating downlink beam signals; and

b) synchronizing transmission timing of frames, symbols and spread chips on the downlink beam signals

wherein signals in the frame are transmitted by a plurality of subcarriers in the frequency domain,

wherein part of the subcarriers in the frame are pilot subcarriers for transmitting pilot signals, which are separated from each other with a frequency spacing over the whole subcarriers so that the mobile station easily performs the channel estimation on a frequency-selective fading channel, and

wherein the pilot signals transmitted at the pilot subcarriers are signals obtained by spreading a predetermined pilot symbol sequence with an orthogonal pilot spreading code unique to each downlink beam.

2. (Currently Amended) The method as recited in claim 1, wherein the frame includes:

a synchronization subframe for making the mobile station acquire synchronization on the downlink signals easily, when the mobile station accesses the multibeam satellite communication system;

a control subframe for transmitting control packets; and

a traffic subframe for transmitting data packets, wherein the signals in the frame are transmitted by ~~a~~ the plurality of subcarriers in the frequency domain.

3. (Original) The method as recited in claim 2, wherein the synchronization subframe includes a predetermined synchronization chip sequence, which are identical for all the beams of the satellite system and scrambled by an identical PN scrambling code.

4. (Cancelled)

5. (Cancelled)

6. (Original) The method as recited in claim 2, wherein the data of the control packet transmitted in the control subframe is spread by an orthogonal control spreading code unique to each downlink beam, the control spreading code used in the control subframe is one in a control spreading code group unique to each downlink beam, and there is a one-to-one relationship between the pilot spreading code and the control spreading code or control spreading code group.

7. (Original) The method as recited in claim 6, wherein if the number of control spreading codes/groups is less than the number of beams, the same control spreading code is reused in beams spaced apart in a predetermined distance or according to a predetermined reuse pattern.

8. (Currently Amended) The method as recited in ~~claim 4~~claim 1, wherein if the number of pilot spreading codes is less than the number of beams, the same pilot spreading code is reused in beams spaced apart in a predetermined distance or according to a predetermined reuse pattern.

9. (Currently Amended) The method as recited in ~~claim 4~~claim 1, wherein the pilot signals are periodically transmitted with a predetermined time interval, and data signals are transmitted at the pilot subcarriers, during the time interval between two consecutive pilot signals together with the pilots signals according to a period.

10. (Original) The method as recited in claim 2, wherein, except for the pilot subcarriers, the rest of subcarriers in the control subframe and the traffic subframe are data subcarriers used for transmitting the control packet in the control subframe or the data packet in the traffic subframe.

11. (Original) The method as recited in claim 10, wherein the data subcarriers are grouped according to a predetermined number of subcarriers in order to form a plurality of frequency slots, and, in the time domain, the control and traffic subframes are divided into a predetermined number of time slots, each slot being divided into a predetermined number of time intervals, each corresponding to a data symbol duration.

12. (Previously Presented) The method as recited in claim 11, wherein the frequencies of the data subcarriers in each frequency slot are separated from each other in a predetermined frequency spacing within the whole system frequency band.

13. (Original) The method as recited in claim 11, wherein the data symbols in each frequency slot are transformed into complex modulation symbols and spread by an orthogonal spreading code, which has a length of the same number of chips as subcarriers in a frequency slot.

14. (Original) The method as recited in claim 13, wherein the complex modulation symbols are spread in two dimensions of time and frequency by an two-dimensional orthogonal spreading code, which has a length of the same number of chips that are obtained by multiplying the number of subcarriers in a frequency slot on the frequency domain and the number of chips corresponding to a data symbol duration on the time domain.

15. (Original) The method as recited in claim 11, wherein the data symbols in the time slots of a frame are interleaved with each other so that the data symbols belonging to a time slot is scattered with a time spacing within a frame.

16. (Original) The method as recited in claim 2, wherein the control subframe and traffic subframe are divided into radio resource units, each unit is defined by is a time slot, a frequency slot and a spreading code, in a three-dimension fashion.

17. (Original) The method as recited in claim 16, wherein one or more radio resource units

are used for transmitting a data packet to an mobile station, and the mobile station is informed which radio resource units are used for the packet transmission by a radio resource allocation message included in the control packet of the control subframe.

18. (Previously Presented) The method as recited in claim 16, wherein the same radio resource unit of the traffic subframe is reused for transmitting a packet to another mobile station belonging to another beam, only when the interference between the packet transmissions is not more than a predetermined level.

19. (Withdrawn) An apparatus for transmitting packets to a mobile station in a forward link of a multibeam satellite communication system, comprising:

a first generation means for generating synchronization sample sequence by using synchronization sequence and a scrambling code;

a second generation means for generating pilot chip sequences;

a third generation means for generating channel encoded and interleaved bit sequences to be transmitted through data subcarriers in a control subframe and a traffic subframe;

a modulation and spreading means for modulating the bit sequences generated by the third generation means into complex modulated symbols by using a modulation method and spreading the modulated symbols in one dimension of time or frequency or in two dimensions of time and frequency;

a multiplexing and interlacing means for multiplexing and interlacing the signals transmitted in the frequency slots and time slots in a frame;

a frequency multiplexing means for frequency-multiplexing the signals from the first and second generation means and the multiplexing and interlacing means;

a scrambling means for scrambling the scrambling code with the output of the frequency multiplexing means; a fourth generation means for generating a multicarrier sample sequences; and

a multiplexing means for multiplexing the synchronous sample sequence generated by the first generation means with the multicarrier sample sequence generated by the fourth generation means.

20. (Withdrawn) A method for transmitting packets to a mobile station in a forward link of a multibeam satellite communication system, comprising the steps of: a) selecting an active beam set by using the signal-to-interference-a- nd-noise ratios (SINRs) of beam pilots which are reported from the mobile station and transmitting a message on the active beam set selection to the mobile station; and b) receiving data packets to be transmitted to the mobile station from terrestrial networks, selecting a service beam whose pilot SINR is largest among the reported pilot SINRs, and transmitting the control packet including a radio resource allocation message in the control subframe of the selected service beam and the data packets in the data subframe to the mobile station.

21. (Withdrawn) The packet transmission method as recited in claim 20, further comprising the step of c) when a packet to be transmitted to the mobile station newly arrives at the center, repeating the step b).

22. (Withdrawn) The packet transmission method as recited in claim 20, further comprising the step c) when the mobile station periodically reports the SINRs of beam pilots, repeating the step a).

23. (Withdrawn) A computer-readable recording medium provided with a microprocessor, for recording a program that implements a packet transmission method for transmitting packets to mobile stations in a forward link of a multibeam satellite communication system, the packet transmission method comprising the steps of:

a) selecting an active beam set by using the signal-to-interference-and-noise ratios (SINRS) of beam pilots which are reported from the mobile station and transmitting a message on the active beam set selection to the mobile station; and

b) receiving data packets to be transmitted to the mobile station from terrestrial networks, selecting a service beam whose pilot SINR is largest among the reported pilot SINRs, and transmitting the control packet including a radio resource allocation message in the control subframe of the selected service beam and the data packets in the data subframe to the mobile station.